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A Comparative Analysis of Effects of Monetary and Fiscal Policies on Economic Activity

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CHAPTER I

INTRODUCTION

In a modern economy, such as the one existing in the United States, the central government must accept resonsibility for the stability of the economy--that is, for the prevention of excessive unemployment on the one hand and excessive price inflation on the other. Political liberals and conservatives both agree on this matter, although, of course, there are still differences of opinion as to how to achieve an appropriate balance of employment and price stability.

The modern economy is controlled primarily by regulating aggregate demand for goods and services. There are two accepted instruments for controlling demand. The Federal Reserve System, through its monetary policies, exerts its influence on demand by altering the supply of money and the cost and availability of credit. The Federal Government, through its fiscal policies, exerts its influence on demand by affecting the aggregate flow of purchasing power and spending by altering the relation between Federal tax collections and expenditures.

Full employment and reasonable price stability can only be maintained if aggregate demand grows in pace with productive capacity. Income and product need to expand each year by as much as the growth of productive capacity, if we are to avoid rising unemployment and maintain a healthy economy. On the other hand, if we permit aggregate demand to expand more rapidly than productive capacity, inflationary pressures will result. We must push our economy, using the proper controls, in order that we can maintain an acceptable level of economic stability.

Thus, recognition that monetary and fiscal policies to maintain full employment and stable prices must be formulated in a framework which makes allowance for the growth of productive capacity is now reasonably well established. By skillful use of monetary and fiscal policies we may be able not only to keep aggregate demand growing in pace with capacity but also to influence the growth of capacity itself.

In 1968, two celebrated American economists engaged in a dialogue with far-reaching implications for government policy in the next decade. On one side was Walter Heller, Chairman of the Council of Economic Advisors under President Kennedy and Johnson, and perhaps the most effective champion of the "new economics". On the other side was Milton Friedman, the leading exponent of a monetary view of the economy and a key advisor to Barry Goldwater and to Richard Nixon. The debate centered on whether minor economic fluctuations can best be controlled by "fine tuning", the frequent and discretionary use of monetary and fiscal policy, or by an automated policy of expansion in the money supply. Although the question remains unresolved, the implications created a new wave of empirical research in order to compare and analyze the effects of monetary and fiscal policies on economic activity.

It is the purpose of this paper to study, analyze, and evaluate the findings of recent studies done on the effects that monetary and fiscal policies have on the modern economy; thereby, determining which one has the greater effect.

In determining whether monetary or fiscal policies have the greater effects on the modern economy, this paper will primarily confine itself to the Federal Reserve-MIT econometric model, designed by de Leeuw and Gramlich, and to the Jordan-Anderson research of the St. Louis Federal

Reserve. The author's own empirical research plus related studies will then aid the reader in determining whether fiscal or monetary policies have the greater effect on the modern economy.

CHAPTER II

A FISCALIST VIEW

Ever since Keynes, economists have recognized that the Federal Government could stimulate the economy by increasing the federal expenditures or by reducing tax receipts. We have progressed from neo-classical economists, Keynesian and neo-Keynesian, to the fiscalist and a new breed of economist who uses the synthesis of whatever is valuable in older economics and in modern theory. Professor Heller instantly became a leader of the new breed of economists when he came out with new labels such as "full employment surplus" and "constructive deficit" during the Kennedy administration. Representing themselves as fiscalists, Heller and his disciples believe the modern economy can be controlled best by "fine tuning", the frequent and discretionary use of monetary and fiscal policy, rather than by the automated policy of expansion in the money supply.

To help determine if the response of economic activity to fiscal policy is greater, more predictable, and faster than it is to monetary policy, this paper will now look at the Federal Reserve-MIT econometric model of the economy.

The Federal Reserve-MIT model was used because it was developed to show the effects of fiscal policy and although monetary policy is assigned a major role, it was "couched in the Keynesian framework". Overall, the model was able to say more than existing models about the effects of monetary policy instruments and in comparison with fiscal policy.

Some of the differences between the Federal Reserve Board--MIT econometric model and other models are:

1. In the financial sector, the general structure of our equation is similar to some other recent models but our estimates of the lags are quite different. By experimenting with alternative formulations applied to data through 1965 and testing the results against data for 1966 and early 1967 we have tentatively concluded that lags in the demand for money are shorter than many recent estimates, and that the transitory impact effect of open market operations on interest rates is smaller than a number of other models imply.[1]

2. The financial sector also differs from some others by including the market for bank commercial loans as an integral part of the determination of money stock and interest rates, and by including a fairly broad range of interest rates.[2]

3. In the investment sector, the plant and equipment equations are derived from the neoclassical theory of the business firm but with allowance for lags in forming expectations, lags between order and shipments, technological change, and the possibility that substitution between capital goods and other factors of production may be feasible to a much greater degree when new equipment or plant is being ordered than after it has been installed. Interest rates and tax rates enter these equations in the way in which the theory of the firm after modification for the complications just listed suggests they should affect returns on investment projects.[3]

4. The equations for housing distinguish between builders and owners of houses on the one hand, and users of dwelling space on the other. It is in the equation describing decisions by the former group to change the inventory of houses under construction that current and recent interest rates enter with a powerful effect.[4]

5. Expenditures and taxes of state and local governments are endogenous in our model in contrast to any other model of our acquaintance. The equations emphasize the interdependence of spending and taxing decions, with an important interest rate effect on state and local construction expenditures and a smaller but still noticeable effect on the proportion of current expenditures financed by taxes.[5]

6. Finally, in our consumption equations we have attempted to distinguish the services yielded by stocks of durable goods from expenditures on durable goods which are a part of consumer spending in the national accounts. The sum of the services of durable goods and expenditures on nondurables and services is the consumption variable that we relate to current and past income, whereas the allocation of the sum among its components depends on relative prices, existing stocks, and other variables. One result of this formulation is a small effect of interest rates on the allocation of total consumption and hence on consumer expenditures on durable goods.[6]

Some of the preliminary results suggested that both monetary and fiscal policies had powerful effects on the economy though monetary policy operates with a longer lag. It was also found that the response of money income to both monetary and fiscal policy changes was stronger than that implied by other large-scale econometric models.

The Federal Reserve Board--MIT econometric model was composed of three large blocks of simultaneous equations. One block, the financial block, dealt with supply and demand equations for financial claims and their dynamics. The fixed investment block covered housing, plant and equipment, and the behavior of state and local governments. The consumption inventory block, covered income shares, imports and Federal personal taxes as well as consumption and inventory investment. Used within the three blocks were 75 behavior equations, identities for 35 other endogenous variables and 70 exogenous variables. The properties of the model, because of its size, were best illustrated by simulation experiments.

Emperical results of the simulation experiments were obtained by measuring the effects of step changes in key policy variables by computing differences between two simulation runs. The first run in every case was a dynamic simulation (actual values for all current lagged exogenous variables) of the model over some time period.

Only initial actual variable values were used for endogenous variables. The model generated solutions for the endogenous variables during the first simulation period, then used these in generating solutions for the second period, etc. The second run in each experiment was another dynamic simulation identical to the first in all respects except that one of the policy variables was altered by a specific amount beginning in a specified quarter and continued for all subsequent quarters of the simulation period. The final step, of computing the differences between the control and experimental simulations, gave the response of endogenous variables in the model to the specified maintained change in the policy variable.

The variables are included in the following definitive equations:

FINANCIAL BLOCK EQUATIONS

1. a reserve identity
2. a demand for free reserves
3. demand for demand deposits
4. demand for time
5. demand for commercial loans
6. demand for currency
7. a term structure
8. supply of time deposits
9. commercial paper rate
10. commercial loan rate
11. mortgage rate
12. a stock market yield

INVESTMENT BLOCK EQUATIONS

A. Investment inPlant Equipment
   1. Gross business product identity
   2. Cost of Capital relations (3)
   3. Identities defining current dollar rent per unit of new investment (3)
   4. Identities defining equilibrium capital output ratios (2)
   5. Demands for orders and expenditures, producers durable equipment (5)
   6. Demand for nonresidential structures
   7. Identity defining stock of nonresidential structures

B. Housing Sector
   1. Housing inventory, starts, and expenditures (3)
   2. Rent and House prices (2)
   3. Identity defining housing stock

C. State and Local Governments
   1. Expenditures (6)
   2. Taxes and profits of government enterprises (5)

CONSUMPTION INVENTORY BLOCK EQUATIONS

1. GNP and Consumption identities (2)
2. Income shares and taxes (4)
3. Total consumption and its components (5)
4. Relation of real consumer expenditures to real consumption (4)
5. Stocks of consumer durables (2)
6. Inventory investment (2)
7. Imports
8. Capacity utilization, materials industries [7]

EQUATIONS FOR THE THREE BLOCKS COMBINED

1. Corporate profits, cash flows, and dividends (5)
2. Federal indirect and social insurance taxes (5)

The conclusions from the limited number of policy simulations conducted were:

(1) Monetary policy is quite powerful -- much more so than was found in other econometric models
(2) Future refinements of the model of which an examination of the financial intermediary -- credit rationing process in the mortgage market is a basic one and could increase the relative power that the model attributes to monetary policy and might shorten the lags.

The findings followed strictly from the staff's best specification of the way in which monetary policy effects the economy. They were not caused by simple expedients such as throwing in the money supply whenever nothing else works. The staff thought that because of their tentative conclusions that a more intensive examination of monetary policy than is usual in econometric models finds monetary factors to be more important than they are usually found to be. [9]

One of the later simulation experiments with the Federal Reserve -- MIT econometric model was to measure the direct effects of monetary policy.

"To measure the effect of the staff's central monetary policy instrument, unborrowed reserves, the response of the model to a maintained reserve increase of $1 billion was examined."[10] It was assumed that the Federal Reserve--MIT model had $1 billion more unborrowed reserves available

than the actual historical amounts in the initial quarter and maintained the million--dollar excess over historical amounts in each succeeding quarter and while doing this, the staff could compute the multiplier over time for this policy change.

> The staff first conducted this experiment for a subset of the equations of the model including only the financial sector and demand equations for categories of goods and services affected directly by monetary policy. This simulation gave them only direct effects of monetary policy on financial markets and, through financial markets, on final spending.[11]

TABLE I

DIRECT EFFECTS OF A BILLION DOLLAR STEP INCREASE IN UNBORROWED RESERVES[12]

A. Billions of Current Dollars

	Personal Consumption			Resident. Construct.			Plt.&Eq.	State & Loc. Cst.				
	Cost of			Cost of	Credit		Cost of	Cost of	Cost of			
arter	Capital	Wealth	Total	Capital	Ratio	Total	Capital	Capital	Capital	Wealth	Credit	Total
4	.3	1.2	1.5	1.0	.6	1.6	.2	.2	1.7	1.2	.6	3.5
8	.4	2.3	2.7	1.3	.5	1.8	.6	.3	2.6	2.3	.5	5.4
12	.5	3.0	3.5	1.5	.3	1.8	1.1	.4	3.5	3.0	.3	6.8
16	.4	3.2	3.6	2.2	-.8	1.4	1.5	.5	4.6	3.2	-.8	7.0

B. Percentages of the Total Effect

					Chan.1	Chan.2	Chan.3
					Cost of		Credit
arter	Consumption	Residential Construction	Plant&Equipement	State&Local	Capital	Wealth	Ratio
4	43	45	6	6	49	34	17
8	50	33	11	6	48	43	9
12	51	26	16	7	51	44	5
16	51	20	21	8	66	45	-11

From TABLE I, it can be seen that the direct effect of the $1 billion open market operation stimulated final demand by $3.5 billion by the end of the year, by $5.4 billion after two years, and up up to $7 billion up to four years. These numbers were smaller than the total effect over the first few years including the multiplier accelerator mechanism and the feedback from the real sector to the financial sector.

Residential construction was responsible for much of the early effect but declines over time.

> This pattern can be attributed largely to the rationing channel. In periods immediately following the policy change, market rates of interest fall relative to the sluggish deposit rates of savings institutions. There follows a sharp rise in savings deposit inflows, which in turn stimulates housing starts and expenditures.[13]

The credit rationing channel alone comprise 17% of the total direct monetary effect by the end of four quarters. Through time, the normal relation between deposit rates and market rates was restored, and savings inflow fell relative to their recent high levels. When the balanced relationship was assumed, the importance of credit rationing was reduced.

The cost of capital channel operated strongly throughout the four year simulation period. "Initial effects were important for housing and ultimate effects both for housing and for plant and equipment."[14] As was mentioned earlier in this paper, cost of capital effects on expenditures lasted only until actual capital stocks had reached their desired levels, but in this model this process was not complete by the end of four years. "One reason for this long lag is the time it takes short-term market interest rates to effect long-term rates."[15] The expenditures were beginning to recede due to changes in the cost of capital even though investments in plant and equipment, multi-family-housing, and state and local construction was still building up after four years.

The wealth effect also operated strongly throughout the period. "Since the wealth effect change affects consumption promptly, it accounted for 35 per cent of the total effect by the end of the first year, 45 per cent by the end of four years, and in the very long run when the channels fade out of the picture, the wealth effect would comprise the entire direct monetary effect."[16]

When the multiplier-accelerator process was set in motion, and real sector feedback was allowed, they enabled us to observe the full model effects of monetary policy when there was a change in unborrowed reserves.

"With the inclusion of the multiplier-accelerator process, the effects of monetary policy are expanded in the earlier years, while the real sector feedback, by allowing the rise in money income to increase interest rates and partial reserve initial rate movements, gradually dampens the long run effects."[17]

The results of the full model simulation that began in 1964 I, were shown in TABLE II.

TABLE II

EFFECTS OF A BILLION DOLLAR STEP INCREASE IN UNBORROWED RESERVES[18]

	Full Model Effects				
arter	Real GNP (Billions 1958 dollars)	GNP Deflator (Percentage points)	Money GNP (Billions Current $s)	Corp.Bnd.Rate % pts.	Unemp. Rate
1	.7	-	.8	-.27	-
2	2.0	-	2.3	-.14	-.1
3	3.6	.1	4.3	-.12	-.2
4	5.4	.1	6.6	-.16	-.3
5	7.0	.2	8.9	-.19	-.4
6	8.3	.3	11.1	-.22	-.5
7	9.3	.4	13.2	-.22	-.6
8	10.0	.5	15.1	-.24	-.6
9	10.5	.8	16.9	-.25	-.7
10	10.7	.9	18.6	-.26	-.7
11	10.3	1.2	19.9	-.24	-.7
12	9.4	1.4	20.6	-.25	-.6
13	7.9	1.7	20.6	-.25	-.6
14	6.1	1.9	20.1	-.23	-.5
15	3.9	2.1	19.0	-.23	-.3
16	1.4	2.2	17.2	-.23	-.3

The effects on real GNP built up to $5.4 billion by one year and $10.0 billion by two years but after that the effects declined rapidly so that by the end of four years there was scarcely any effect on real income.

> The four year effect of the monetary change on money GNP was thus almost entirely in the form of higher prices. For the first two years the full system response for real GNP was much larger than the direct effect shown in TABLE I because of the multiplier-accelerator mechanism. But after that the full system's real response dies out because of the occillations inherent in the accelerator system as well as because of the rises in interest rates stimulated by the rise in money GNP.[19]

The interest rate feedback was illustrated in the direct effect simulations underlying TABLE I. The corporate Aaa rate declined by 46 basis points after four years while in the full model simulations underlying TABLE II, the corporate declined by only 23 basis points.

"To determine the effect of initial conditions, full multipliers for different initial conditions were used with different directions of policy change."[20] One set of simulations began in 1964 I and raised unborrowed reserves and for the other set, which began in 1958 II, lowered unborrowed reserves.

> The obvious difference between those two initial periods was the difference in inflationary potential. The quarters during and after 1964 were ones of fairly high resource utilization, and the expansion of reserves at this time would be expected to stimulate price increase promptly. On the other hand, there was substantial excess capacity in 1958 and the decrease in reserves at that time could be expected to have minimal short run effect on prices.[21]

"Another, perhaps less obvious difference between the two periods which affects the simulation results is the difference in initial stock market conditions."[22]

These differences were illustrated by Tables II and III. We see that initial real income effects in the 1964 simulation were moderately larger than in the 1958 simulation, mainly because of the greater impact of the dividend price ratio. The price response was substantially higher in 1964, even allowing for the bigger initial real income response, because of the lower initial unemployment rate. But it is interesting to note that the much higher 1964 money GNP response leads to a greater reversal of initial interest rate movements which means that by the end of four years the real GNP response was much less in the 1964 simulations. In the very long run of, say, fifteen or twenty years, the real GNP response would die out in both cases - but this happens more quickly the faster prices respond.[23]

TABLE III

EFFECTS OF A MILLION DOLLAR STEP DECREASE IN UNBORROWED RESERVES[24]

Full Model Effects
(Initial Conditions of 1958 II)

Quarter	Real GNP (billions 1968 dollars)	GNP Deflator (percentage points)	Money GNP (billions current dollars)	Corporate Aaa Bond Rate (percentage points)	Unemployment Rate (percentage points)
1	-.5	-	-.5	.27	-
2	-1.3	-.1	-1.5	.14	.1
3	-2.7	-.1	-2.9	.13	.2
4	-4.2	-.1	-4.6	.17	.3
5	-5.4	-.2	-6.1	.20	.4
6	-6.5	-.2	-7.5	.24	.5
7	-7.3	-.3	-8.8	.27	.6
8	-7.9	-.4	-9.8	.28	.7
9	-8.3	-.5	-10.7	.29	.7
10	-8.5	-.6	-11.5	.29	.7
11	-8.6	-.7	-12.1	.29	.7
12	-8.4	-.8	-12.5	.30	.7
13	-8.1	-.9	-12.8	.30	.7
14	-7.7	-1.0	-13.1	.30	.7
15	-7.2	-1.1	-13.2	.30	.6
16	-6.6	-1.2	-13.4	.29	.6

The study was brought to a conclusion by comparing monetary policy multipliers with multipliers for common fiscal policy stabilization tools. The comparisons were given in Table IV, which showed the full model response to (A) a one billion increase in unborrowed reserves, (B) a five billion dollar

increase in real federal compensation of employees, and (C) a .02 decrease in the personal income tax rate (the latter implies an initial revenue loss of 4.5 billion at 1964 I levels.)"[25]

TABLE IV

EFFECTS OF THREE EXPANSIONARY POLICIES [26]

(Initial Condition of 1964 I)

rter	Real GNP (billions 1958 dollars)			GNP Deflator (percentage points)			Money GNP (billions current dollars)			Corporate Aaa Rate (percentage points)			Unemployment Rate (percent.pt		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1	.7	6.6	1.4	-	-	-	.8	7.3	1.6	-.27	.06	.03	-	-.2	-
2	2.0	8.3	2.9	-	-	-	2.3	9.3	3.4	-.14	.05	.02	-.1	-.5	-.2
3	3.6	8.7	3.6	.1	.2	.1	4.3	10.3	4.4	-.12	.05	.02	-.2	-.6	-.2
4	5.4	8.9	4.0	.1	.2	.1	6.6	11.2	5.2	-.16	.06	.03	-.3	-.6	-.3
5	7.0	9.0	4.5	.2	.4	.2	8.9	12.0	6.1	-.19	.08	.04	-.4	-.6	-.
6	8.3	8.7	4.8	.3	.4	.2	11.1	12.4	6.8	-.22	.09	.05	-.5	-.6	-.
7	9.3	8.0	5.0	.4	.6	.3	13.2	12.6	7.6	-.23	.10	.06	-.6	-.6	-.
8	10.0	7.9	5.2	.6	.7	.4	15.1	13.5	8.5	-.24	.12	.07	-.6	-.6	-.
9	10.4	7.6	5.3	.8	.9	.5	16.9	14.1	9.3	-.25	.14	.09	-.7	-.5	-.
10	10.7	6.8	5.4	.9	1.0	.6	18.6	14.3	10.1	-.26	.16	.10	-.7	-.5	-.
11	10.3	6.1	5.4	1.2	1.1	.7	19.9	14.5	10.9	-.24	.17	.12	-.7	-.4	-.
12	9.4	5.6	5.2	1.4	1.3	.8	20.6	15.2	11.6	-.25	.19	.14	-.6	-.4	-.
13	7.9	5.8	4.7	1.7	1.4	.9	20.6	16.5	11.8	-.25	.20	.14	-.6	-.4	-.
14	6.1	6.2	3.9	1.9	1.6	1.1	20.1	18.2	11.7	-.23	.22	.15	-.5	-.4	-.
15	3.9	5.7	2.8	2.1	1.8	1.2	19.0	18.8	11.3	-.23	.24	.16	-.3	-.4	-.2
16	1.4	5.0	1.6	2.2	1.9	1.2	17.2	19.2	10.6	-.23	.25	.18	-.2	-.3	-.2

A - Step increase in unborrowed reserves of $1.0 billion.
B - Step increase in real federal wage payments of $5.0 billion.
C - Step decrease in personal tax of .02 (about $4.5 billion in revenue).

> The size of these policy changes, and hence of the real GNP and price results, was arbitrary; there was nothing natural about comparing $1 billion reserve change with a $5 billion expenditure change or any other specific amount. What were of interest were the dynamic path, which showed a much more rapid approach to real GNP effects for Federal spending than for monetary policy, with tax rates in between the two. [27]

"Monetary policy worked more slowly than fiscal policy in this model because it takes time for the open market operations to be reflected in changes in long-term interest, and even more time for these rate changes to be reflected in investment decisions."[28]

> Comparisons of these results with other models revealed a mixture of similarities and differences. Although the fiscal policy multipliers in Table IV roughly agreed with those of other econometric models, the monetary multipliers had about the same ultimate effect as those obtained by the staff of the St. Louis Federal Reserve Bank in a regression of GNP on monetary and fiscal variables, though the timing patterns and the effect of the fiscal policy computed by the two studies were radically different.[29]

The comparison is the strongest fiscal policy view to be found.

The use of the Federal Reserve--MIT model to study the relative importance of monetary and fiscal influences on economic activity has its strong and weak points. One of the strong points is that it allows one to distinguish between direct and indirect monetary and fiscal influences, and to see how subsectors of the economy are affected. Another good point is that it allows a wider range of questions to be answered.

The weak points of the model were several. We have to assume that the monetary and fiscal variables were introduced in the model where there roles are indicated by economic theory. For example, unborrowed reserves were used as a measure of monetary influence rather than the money supply or money base. "Anderson and Jordan have argued that "unborrowed reserves" is not a relevant measure of monetary influence."[30]

Another disadvantage is that the model may have ommitted an important channel of transmission. "For example, assuming that the cost of borrowing is an important link in the monetary transmission mechanism, it is possible that this is not accurately measured by market interest rates because both changes in credit rationing and compensating balance requirements could affect the cost of borrowing yet not be reflected in changes in market interest rates."[31]

It is apparent that further work on the specification and estimation of the model be done in order to reconcile different views about how monetary and fiscal policy tools operate.

CHAPTER III

A MONETARIST VIEW

The monetarist view that changes in the money stock are a primary determinant of changes in total spending, and should thereby be given major emphasis in economic stabilization programs, has been of growing interest in recent years. Monetarists and fiscalists alike feel that "high employment, rising output of goods and services, and stable prices, are three widely accepted national goals."[32] How to achieve the goals is the big question.

"Three commonly held propositions concerning the relative importance of monetary and fiscal actions in implementing economic stabilization policy are: the response of economic activity to fiscal actions relative to that of monetary actions is (1) greater, (2) more predictable, and (3) faster."[33] It is the contention of the monetarists, Milton Friedman and his "right arm", the St. Louis Federal Reserve Bank, that monetary influences have a stronger, more predictable, and faster impact on economic activity than fiscal influences.

This paper will now look at the single equation approach, developed by Jordan and Anderson, and evaluate the relationships between numerous variables and their bearing upon economic stabilization. The Jordan-Anderson studies and the related studies offer the strongest suppost for the monetarist view.

Leon Walras outlined a framework for analyzing a complex market economy which included a demand and supply relationship for every commodity and factor of production.

According to Walras' analysis outside occurrences reflected in shifts in demand and supply relationships caused changes in market prices and in quantities traded. "These outside events included changes in preferences of market participants, in resource endowment, and in technology, whereas, financial assets were not viewed as providing utility or satisfaction to their holders and were therefore excluded from the analysis."[34]

"Later developments in economic theory have viewed financial assets as providing flows of services which also provide utility or satisfaction to holders."[35] An example of this view is best illustrated when economic entities incorporate choices among goods, services, and financial assets into their decision-making processes. Because of choices being made for goods and services and financial assets, demand and supply relationships exist for every financial asset. Therefore, interest rates are determined by the market process along with prices and quantities of goods and services. From these theoretical developments, a classification of market variables was obtained. These market variables can be classified as dependent or independent. The dependent variables are dtermined by the interplay of market forces which result from changes in the independent variables. "Market determined variables include prices and quantities of goods and services, prices and quantities of factors of production, prices (interest rates) and quantities of financial assets, and expectations based on: (a) movements in dependent variables, (b) expected results of random events, and (c) expected changes in fiscal and monetary policy."[36]

> Independent variables consist of 1. Slowly changing factors: a. preferences; b. technology; c. resources; d. institutional and legal framework, 2. Events ouside of the domestic economy: a. change in total world trade; b. movements in foreign prices and interest rates; 3. Random events: a. outbreak of war; b. major strikes; c. weather; 4. Forces sugject to control by: a. fiscal actions; b. monetary actions.[37]

"Three theoretical approaches have been advanced by economist for analyzing the influence of monetary and fiscal actions on economic activity and they are: (1) the textbook Keynasian analysis derived from economic thought of the late 1930's to early 1950's, (2) the portfolio approach developed over the last two decades, and (3) the modern quantity theory of money."[38] Frequently used statements which supposedly represent these theories are examined by using common measures of economic activity, monetary actions and fiscal actions.

As a measure of economic activity, total spending for goods and services (gross national product at current prices) was used. "It consists of total spending on final goods and services by households, businesses, and governments plus net foreign investment."[39]

Monetary actions involve primarily decisions of the Treasury and the Federal Reserve System. "Treasury monetary actions consist of variations in its cash holding deposits at Federal Reserve Banks and at commercial banks, and issuance of treasury currency."[40] "Federal Reserve monetary actions include changes in its portfolio of Government securities, variations in member bank reserve requirements, and changes in the Federal Reserve discount rate."[41] Other monetary actions are commercial banks holding excess reserves and the public's decisions to hold varying amounts of time deposits relative to demand deposits.

> The monetary base is considered by both the portfolio and the modern quantity theory schools to be a strategic monetary variable. The monetary base is defined as the total of federal reserve credity, gold stock, treasury currency outstanding, treasury deposits at federal reserve, treasury cash holdings, other deposits, and other federal reserve accounts plus reserve adjustments. Those who find the monetary base to be a strategic variable cite two reasons for doing so. First, there is a significant body of monetary theory which incorporates the monetary base as an important link between Federal Reserve monetary actions and their ultimate impact on income, output, and prices. Second, among all the variables cited above as measures of monetary actions, the monetary authorities have the most complete control

over the monetary base, and the base reflects the actions of these authorities more directly than the other measures do. Both the portfolio and the modern quantity theory schools consider an increase in the monetary base, other forces constant, to be an expansionary influence on economic activity and a decrease to be a restrictive influence.[42]

TABLE V

STABILIZATION ACTIONS AND THEIR MEASUREMENT[43]

ABILIZATION ACTIONS	FREQUENTLY USED MEASUREMENTS OF ACTIONS
Monetary Actions	1. Monetary Actions
ederal Reserve System	Monetary base.
a. open market transactions.	Money stock, narrowly defined.
b. discount rate change.	Money plus time deposits.
c. reserve requirement changes.	Commercial bank credit.
	Private demand deposits.
reasury	
a. changes in cash holdings.	2. Fiscal Actions
b. changes in deposits at Reserve banks.	High-employment expenditures.
c. changes in deposits at commercial banks.	High-employment receipts.
d. changes in Treasury currency outstanding.	High-employment surplus.
	Weighted high-employment expenditures.
Fiscal Actions	Weighted high-employment receipts.
overnment spending programs.	Weighted high-employment surplus.
overnment taxing provisions.	National income account expenditures.
	National income account receipts.
	Autonomous changes in Government tax rates.
	Net Government debt outside of agencies and trust funds.

The portfolio school holds that a change in the monetary base affects investment spending, and thereby aggregate spending, through changes in market interest rates relative to the supply price of capital (real rate of return on capital). The modern quantity theory holds that the influence of the monetary base works through changes in the money stock which in turn affect prices, interest rates, and spending on goods and services. Increases in the base are reflected in increases in the money stock which in turn result directly and indirectly in increased expenditures on a whole spectrum of capital and consumer goods. Both prices of goods and interest rates form the transmission mechanism in the modern quantity theory.[44]

The simple Keynesian approach postulates that a change in the stock of money relative to its demand results in a change in interest rates.

It also postulates that investment spending depends in turn on these investment decisions. "Similarily, in the portfolio school of thought, changes in the money stock lead to changes in the interest rates, which are followed by substitutions in asset portfolios, then finally total spending is affected."[45] The key parts of the transmission mechanism, as far as the portfolio school of thought appears, are the interest rates which influence decisions to hold money versus alternative financial assets as well as decions to invest in real assets.

The role of money in determining economic activityranges from "money does not matter" to money is the dominant figure". The controversy was summarized by Thomas Mayer when he concluded:

> All in all, much recent evidence supports the view that the stock of money and, therefore, monetary policy, has a substancial effect. Note, however, that this reading of the evidence is by no means acceptable to all economists. Some, Professor Friedman and Dr. Warburton for example, argue that changes in the stock of money do have a dominant effect on income, at least in the long run, while others such Professor Hansen believe that changes in the stock of money are largely offset by opposite changes in velocity.[46]

The changes in the money stock or monetary base are frequently used as measures of monetary action, although the money base was not used in this author's own study. "Money is narrowly defined as the non-bank public's holdings of demand deposits plus currency."[47] The changes in the money stock reflect monetary actions of the Federal Reserve, the Treasury, and commercial banks.

Fiscal policy actions on economic activity are frequently measured by Federal Government spending, changes in Federal tax rates, or Federal budget deficits and surpluses.

The Keynesian view cincentrates heavily on the direct influence of fiscal action on total spending.

> The government spending is a direct demand for goods and services. Tax rates affect disposable income, a major determinant of consumer spending and profits of businesses, a major determinant of investment spending. Budget surpluses and deficits are used as a measure of the net direct influence of spending and taxing on economic activity.[48]

Tobin, in developing the portfolio approach, attributes to fiscal actions both a direct influence on economic activity and an indirect influence both of which take into consideration the financing of government expenditures.

> Financing or expenditures by issuance of demand debt of monetary authorities (the monetary base) results in the full Keynesian multiplier effect. Financing by either taxes or borrowing from the public has a smaller multiplier effect on spending.[49]

The latter two means of the financing of expenditures are direct influences of fiscal actions of economic activity.

The indirect influence of fiscal actions result from variations in the relative amounts of demand debt, short-term debt, and long-term debt. For example,"an expansionary move would be a shift from long-term to short-term debt or shifting from short-term in the opposite direction."[50]

The modern quantity theory also feels that the measure of fiscal actions depends on the method of financing Government expenditures. "However, the net influence on total spending resulting from interest rate and wealth changes is ambiguous and only a deficit financed by the monetary system is necessarily expansionary."[51]

High employment budget concepts have been developed as measures of the influence of fiscal actions on economic activity.

> In these budget concepts, expenditures include both those for goods and services and those for transfer payments, adjusted for the influence of economic activity. Receipts, similarly adjusted, primarily reflect legislated changes in Federal Government tax rates, including Social

> Security taxes. The net of receipts and expenditures is used as a net measure of changes in expenditure provisions and in tax rates.[53]

"Tests using other variables mentioned in Table V did not change the conclusions that were reached in this article."[53]

In order to analyze the three propositions put forth earlier, empirical relationships between measures of fiscal and monetary actions and total spending needed to be established.

> These relationships were developed by regressing quarter-to-quarter changes in GNP on quarter-to-quarter changes in money stock (M) and in the various measures of fiscal actions: high-employment budget surplus(R-E), high employment expenditures (e), and high employment receipts (R). Similar equations were estimated where changes in the monetary base (B) were used in place of the money stock.[54]

> Changes in all variables were computed by two methods. Conventional first differences were calculated by subtracting the value for the preceding quarter from the value from the present quarter. The other method used is an averaging procedure used by Kareken and Solow called central differences. The structure of lags presenting the regressions was estimated with the use of the Almon lag technique. The data were seasonally adjusted quarterly averages for the period from the first quarter of 1952 to the second quarter of 1968.[55]

Certain relationships are expected to exist between measures of economic activity and measure of monetary and fiscal actions. "The empirical relationship embodied in each regression coefficient is the total response (including both direct and indirect responses) of GNP to changes in each measure of a stabilization action, assuming all other forces remain constant."[56]

> Using the total response concept, changes in GNP are expected to be positively related to changes in the money stock (M) or changes in the monetary base (B). With regard to the high-employment surplus (receipts minus expenditures), a larger surplus or a smaller deficit is expected to have a negative influence on GNP and conversely. Changes in high-employment expenditures (E) are expected to have a positive influence and changes in receipts (R) are expected to have a negative influence when these variables are included separately.[57]

The R^2 statistic, a measure of the percent of the variance in changes in GNP explained by the regression equation, ranged from 153 to .73. Most of the values of the estimated regression coefficients for changes in the money stock or the monetary base had a high statistical significance. See TABLE VI.

TABLE VI

REGRESSION OF CHANGES IN GNP ON CHANGES IN MONETARY AND FISCAL ACTIONS[58]

First differences	(Equation 1.1) ΔM	Δ(R-E)	(Equation 1.2) ΔM	ΔE	ΔR	(Equation 1.3) ΔM	ΔE	(Equation 1.4) ΔB	ΔE	ΔR
t	1.57*	-.15	1.51*	.36	.16	1.54*	.40	1.02	.23	.52
	(2.17)	(.65)	(2.03)	(1.15)	(.53)	(2.47)	(1.48)	(.49)	(.67)	(1.68)
t-1	1.94*	-.20	2.59*	.53*	-.01	1.56*	.54*	5.46*	.37	.02
	(3.60)	(1.08)	(2.85)	(2.15)	(.03)	(3.43)	(2.68)	(3.37)	(1.36)	(.07)
t-2	1.80*	.10	1.47*	-.05	-.03	1.44*	-.03	6.48*	-.21	-.17
	(3.37)	(.55)	(2.69)	(.19)	(.10)	(3.18)	(.13)	(4.10)	(.84)	(.64)
t-3	1.28	.47*	1.27	-.78*	.11	1.29*	-.74	3.05	-.93*	.14
	(1.88)	(1.95)	(1.82)	(2.82)	(.32)	(2.00)	(2.85)	(1.54)	(3.10)	(.39)
Sum	6.59*	.22	5.84*	.07	.23	5.83*	.17	16.01*	-.54	.51
	(7.73)	(.45)	(6.57)	(.13)	(.32)	(7.25)	(.54)	(5.67)	(.89)	(.67)
nstant	1.99*		2.10			2.28*		1.55		
	(2.16)		(1.88)			(2.76)		(1.22)		
R^2	.56		.58			.60		.53		
S.E.	4.24		4.11			4.01		4.53		
D-W	1.54		1.80			1.78		1.71		

Central differences	(Equation 2.1) ΔM	Δ(R-E)	(Equation 2.2) ΔM	ΔE	ΔR	(Equation 2.3) ΔM	ΔE	(Equation 2.4) ΔB	ΔE	ΔR
t	1.50	-.24	1.58	.53	.32	1.54*	.63*	.61	.28	.87*
	(1.84)	(.91)	(2.01)	(1.52)	(1.05)	(2.45)	(2.21)	(.28)	(.73)	(2.55)
t-1	2.11*	1.23	1.57*	.60	-.04	1.63*	.59*	5.42*	.50	-.07
	(3.61)	(1.16)	(2.78)	(2.44)	(.17)	(3.57)	(2.61)	(3.16)	(1.87)	(.27)
t-2	1.89*	.15	1.41*	-.15	-.11	1.43*	-.16	6.87*	-.27	-.33
	(3.18)	(.81)	(2.45)	(.60)	(.47)	(3.16)	(.71)	(3.92)	(1.04)	(1.31)
t-3	1.06	.52	1.26	-.96*	.18	1.13	-.86	3.51	-1.26*	.35
	(1.36)	(1.90)	(1.72)	(3.15)	(.48)	(1.71)	(3.07)	(1.71)	(3.65)	(.87)
Sum	6.56*	.21	5.80*	.02	.35	5.74*	.19	16.41*	-.75	.82
	(8.16)	(.47)	(7.57)	(.04)	(.54)	(8.45)	(.77)	(6.95)	(1.37)	(1.16
nstant	2.02*		2.00*			2.30*		1.24		
	(2.48)		(2.14)			(3.55)		(1.14)		
R^2	.66		.72			.73		.67		
S.E.	3.35		3.03			2.97		3.26		
D-W	.88		1.14			1.13		1.05		

e: Regression coefficients are the top figures, and their "t" values appear below each coefficient enclosed by parentheses. The regression coefficients marked by an asterisk (*)

The total response of GNP to changes in money or the monetary base over four quarters revealed a positive relationship with statistically significant coefficients. "The coefficients of each measure of monetary action may be summed to provide an indication of the overall response of GNP to changes in monetary actions."[59]

These summed coefficients were also statistically significant and consistent with the postulated relationships.

As was pointed out before, the high-employment surplus or deficit is often used as a measure of the direction and strength of fiscal actions.

> Equation 1.1 summarizes the total response of GNP to changes in money and changes in the high-employment surplus. The coefficients of the high-employment surplus estimated for the contemporaneous and first lagged quarter have the expected sign, but the coefficients are of very low statistical significance and do not differ significantly from zero. The signs of the coefficients estimated for the second and third lagged quarters are opposite to the expected signs. The sum of the coefficients (total response distributed over four quarters) is estimated to have a positive sign (opposite the postulated sign) but is not statistically significant. These results provide no empirical support for the view that fiscal actions measured by the high-employment surplus have a significant influence on GNP. In principle, these results may have occured either because the high-employment surplus was not good measure of fiscal influence, or because fiscal influence was not important during the sample period.[60]

Keynesian models of income dtermination theoretically state that changes in tax rates exert a negative influence on economic activity, while changes in Government expenditures exert a positive influence. Equation 1.2 and 1.3 provided tests of these propositions.

> The signs of the coefficients estimated for tax receipts are the same as the hypothesized signs for only the first and second lagged quarter. However, since these coefficients (individually and the sums) are of low statistical significance, no importance can be attached to this variable. Inclusion of changes in receipts (ΔB) in equations 1.2 does not improve the overall results, in terms of R^2 and the standard error of estimate, compared with equation 1.3 from which receipts are excluded.[61]

These results provided no support for theories which indicate that changes in tax receipts due to changes in tax rates exert an overall negative influence on economic activity. The results were consistent with theories which indicate that if the alternative to tax revenue is borrowing from the public in order to finance Government spending, then the influence of spending will not necessarily be greater if the funds are borrowed rather than obtained through taxation. The results also indicate that consumers will maintain consumption levels at the expense of saving when there is a temporary reduction in disposable income.

> The signs of the coefficients estimated for high-employment expenditures in equations 1.2 and 1.3 indicate that an increase in Government expenditures is mildly stimulative in the quarter in which spending is increased and in the following quarter. However, in the subsequent two quarters this increase in expenditures causes offsetting negative influences. The overall effect of a change in expenditures distributed over four quarters, indicated by the sum, is relatively small and not statistically significant. These results are consistent with modern quantitiy theories which hold that Government spending, taxing, and borrowing policies would have, through interest rate and wealth effects, different impacts on economic activity under varying circumstances.[62]

The empirical relationships previously developed relating changes in GNP to changes in the money stock and changes in high-employment expenditures and receipts were used to test the three propositions under consideration.

Proposition I stated that fiscal actions exerted a larger influence on economic activity than did monetary actions. This implied then that the coefficients for changes in (E) would be larger than those for changes in (M) and (B). By using "beta coefficients" which take into consideration the past variation of changes in each indipendent variable relative to the past variation of changes in GNP, the size of beta coefficients may therefore be compared as measures of the relative contribution of each variable to variations in GNP in the test period.

TABLE VII

MEASUREMENTS OF THE RELATIVE IMPORTANCE OF MONETARY AND FISCAL ACTIONS[63]

First Differences (equations 1.2 and 1.4)

	Beta Coefficients						Partial Coefficients of Determinatic					
Quarter	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	.24	.14	.05	.06	.09	.16	.07	.02	.01	*	.01	.05
t-1	.26	.20	*	.31	.14	.01	.14	.08	*	.18	.03	*
t-2	.24	-.02	-.01	.37	-.08	-.05	.12	*	*	.24	.01	.01
t-3	.20	-.30	.03	.17	-.36	.04	.06	.13	*	.04	.16	*
sum	.94	.02	.07	.91	-.21	.16	.45	*	*	.38	.02	.01

Central Differences (equations 2.2 and 2.4)

	Beta Coefficients						Partial Coefficients of Determination					
Quarter	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	.26	.20	.09	.04	.11	.25	.07	.04	.02	*	.01	.11
t-1	.26	.23	-.01	.31	.19	-.02	.13	.10	*	.16	.06	*
t-2	.23	-.06	-.03	.40	-.10	-.09	.11	.01	*	.23	.02	.03
t-3	.20	-.36	.05	.20	-.47	.10	.05	.16	*	.05	.21	.01
sum	.95	.01	.10	.95	-.27	.24	.53	*	.01	.49	.04	.03

* Less than .005

Table VII showed the beta coefficients for changes in money were greater than those changes in high-employment expenditures for the quarter in which the change occurred and during the following two quarters. "In the lagged quarters in which the beta coefficients for changes in (E) were the largest, a negative sign was associated with the regression coefficients, indicating a lagged contradictory effect of increased expenditures."[64] As a measure of the total contribution over the four quarters, the sum of the beta coefficients for changes in money and the monetary base were much greater than those for changes in expenditures.

"Proposition I was also tested by the use of partial coefficients of determination."[65] These statistics are measures of the per cent of variation of the dependent variable remaining after the variation accounted for by all other variables in the regression has been subtracted from the

total variations. Proposition I implied that larger coefficients should have been observed for fiscal actions than for monetary actions. Table VII presents the partial coefficients of determination for the variables under consideration.

> For the quarter of change and the subsequent two quarters, these coefficients for ΔM are much greater than those for ΔE. With regard to ΔB, the coefficients are about equal to those for ΔE in the first quarter and are much greater in the two subsequent quarters. The partial coefficients of determination for the total contribution of each policy variable to changes in GNP over four quarters may be developed. Table II shows that the partial coefficients of determination for the over-all response of GNP to ΔM and ΔB range from .38 to .53 while those for ΔE are virtually zero.[66]

Another study conducted by Anderson and Jordan related to three alternative actions assumed taken by stabilization authorities. One section is to increase government by $1 billion financed by either borrowing from the public or increasing taxes. A second action is to increase the money stock by $1 billion with no change in the budget position. And a third action would be to increase government spending by $1 billion for a year and is financed by increasing the money stock by an equal amount.

> The impact on total spending of the first two actions may be measured by using the sums of the regression coefficients presented for equation 1.3. A billion dollar increase in the rate of government spending would, after four quarters, result in a permanent increase of $170 million in GNP. By comparison, an increase of the same magnitude in money would result in GNP being $5.8 billion permanently higher after four quarters.[67]

TABLE VIII

Simulated Response of an Increase in Government Expenditures Financed by Monetary Expansion

(Millions of dollars)

	Increase in Government Expenditures			Required Increase in Money			Total Response G	
uarter	Change in Expenditures	Impact Effect on GNP	Cumulative Effect on GNP	Change in Money Stock	Impact Effect on GNP	Cumulative Effect on GNP	Impact Effect on GNP	Cum. Effect on GN
1	$1000	$400	$400	$200	$ 385	$ 385	$ 785	$ 785
2	0	540	940	250	775	1160	1315	2100
3	0	-30	910	250	1135	2295	1105	3205
4	0	-740	170	250	1458	3753	718	3923
5	-1000	-400	-230	0	1072	4825	672	3595
6	0	-540	-770	0	682	5507	142	4737
7	0	30	-740	0	323	5830	353	5090

> The results of the last action are presented in Table VII. The annual rate of government spending is assumed to be increased by $ billion in the first quarter and held at that rate for the following three quarters. This would require an increase in money of $250 million during each of the four quarters to finance the higher level of expenditures. Since we are interested only in the result of financing of the original increase in expenditures by monetary expansion, expenditures must be reduced by $1 billion in the fifth quarter. If expenditures were held at the higher rate, money would have to continue to grow $250 million per quarter. According to Table VIII GNP would rise to a permanent level $5.8 billion higher than at the beginning. This increase is GNP results entirely from monetary expansion.[69]

The regression results from these three tests indicated that the proposition that the response of total demand to fiscal action was greater than that of monetary action was not confirmed.

Proposition II held that the reponse of economic activity to fiscal actions is more predictable that the response to monetary influence.

> This implies that the regression coefficients relative to their standard errors (this ratio is called the "t-value"). relating changes in E to changes in GNP, should be greater, than the corresponding measures for changes in M and in B. The greater the t-value, the more confidence there is in the estimated regression coefficient, and hence, the greater is the reliability of the estimated change in GNP resulting from a change in the variable. These t-values are presented in Table IX.[70]

TABLE IX

Measurement of Reliability of the Response of GNP to Monetary and Fiscal Actions[71]
("t-values" of Regression Coefficients)

First Differences

Quarter	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	2.03	1.15	0.53	0.49	0.67	1.68
t-1	2.85	2.15	0.03	3.37	1.36	0.07
t-2	2.69	0.19	0.10	4.10	0.84	0.64
t-3	1.82	2.82	0.32	1.54	3.10	0.39
Sum	6.57	0.13	0.32	5.67	0.89	0.67

Central Differences

Quarter	ΔM	ΔE	ΔR	ΔB	ΔE	ΔR
t	2.01	1.52	1.05	0.28	0.73	2.55
t-1	2.78	2.44	0.17	3.16	1.87	0.27
t-3	2.45	0.60	0.46	3.92	1.04	1.31
Sum	7.57	0.04	0.54	6.95	1.37	1.16

t-values associated with equations 1.2, 1.4, 2.2 and 2.4 in Table VI.

In examining Table IX, the monetary variables had the greater t-values for the regression coefficients rather than did the fiscal variables. Also the t-values for the sum of the regression coefficients for change in (M) and (B) were large, while those for the changes in (E) were not statistically significant. Since the regression results implied by proposition II did not appear, the proposition was not confirmed.

Proposition III stated that the influence of fiscal actions on economic activity occurs faster than that of monetary actions. "It was tested by examining the characteristics of the lag structure of the regressions."[72] Proposition III implied that beta coefficients for changes in (E) should have been greater than those for changes in (M) in the quarter of a change and in those immediately following. It also implied that the main response of GNP to fiscal actions occured within fewer quarters than its response to monetary actions.

> A change in the money stock induced a large and almost equal response in each of the four quarters. The largest response of GNP to changes in the monetary base occured the first and second quarters after a change. The beta coefficients for changes in M were greater than those for changes in E for the quarter of a change and the following quarter, indicating comparatively smaller response of GNP to fiscal actions in these first two quarters. Moreover, the largest coefficient for ΔE occured for the third quarter after a change.
>
> The expected regression results implied by Proposition III were not found. Therefore, the proposition that the major impact of fiscal influence on economic activity occurs within a shorter time interval than monetary influence is not confirmed.[73]

In summarizing the propositions that the response of economic activity to fiscal actions relative to monetary actions was (I) larger, (II) more predictable, and (III) faster, the results were not consistent with any of these propositions. "Consequently, either the commonly used

measures of fiscal influence do not correctly indicate the degree and direction of such influence, or there was no measurable net fiscal influence on total spending in the test period.[74]

In a later study conducted by Michael W. Keran, the Anderson and Jordan study was recreated over a longer time period (1919-1969 rather than 1953-1968). The same proposition which Anderson and Jordan tested were tested by Keran and provided additional evidence that monetary influences consistantly have been stronger, more predictable, and faster in their effect on economic activity than have fiscal influences.

When using the sums of the beta coefficients to determine the relative impact on the economic activity caused by changes in the money stock and changes in government expenditures, it was learned that the monetary influence was larger and statistically significant, while the fiscal influence was negative and statistically insignificant as observed in TABLE X.

TABLE X

Beta Coefficients[75]

	ΔM sum	ΔE sum
II/1919 - I/69	*.331	-.026
II/1919 - II/29	*.515	-
III/1929 - II/39	*.593	-.803
III/1939 - IV/46	-.153	.219
I/1947 - IV/52	*1.768	-2.347
I/1953 - I/69	*.726	-.159

NOTE: * Significant at the 95% level of confidence

To determine which variable was more predictable, whichever one has the higher statistical significant coefficient is more reliable was used as being the most predictable.

> Statistical significance is measured by the t-values of the coefficients of the monetary and fiscal variable, when measured against the same dependent variable, which in this case was a change in (Y). A t-value is a statistical indicator of the confidence one may have that the

"true relationship" between the independent and dependent variable has the same significance as the statisitcally estimated coefficient of that relationship. The larger a t-value, the more confidence we have that the monetary and fiscal variables are related to economic activity.[76] The t-values are presented in TABLE XI.

TABLE XI

t-values[77]

	ΔM (SUM)	Δ E (SUM)
II/1919 - I/69	4.31	-.28
II/1919 - II/29	3.16	0
III/1929 - II/39	3.41	-1.95
III/1939 - IV/46	-.59	.81
I/1947 - IV/52	3.51	-4.12
I/1953 - I/1969	4.70	-1.07

The monetary variable had a considerably higher t-value than did the fiscal variable for the whole period. The same held true during the sub-periods with the exception of the war and early post-war periods. In general, the monetary variable had a more predictable effect on economic activity than the fiscal variable.

To determine which variable, monetary or fiscal worked faster on the economic activity, observation of the variables with the shorter time lage produced the desired findings.

> After changing the quarterly patterns of the regression coefficents into beta coefficents and charting them, the monetary variable had a consistently faster influence on economic activity than the fiscal variable in all the sub-periods with the exception of the wa period of 1939-1946.[78]

In summarizing all of the studies conducted by the St. Louis Review, which includes Jordon and Andersonb studies along with Keran's, the following points are to be made:

> The finding that statements which assert that changes in tax rates have a significant influence on total spending are not supported by this empirical investigation suggests that past efforts in this regard have been overly optimistic.

2. The finding that the response of total spending to changes in Government expenditures is small compared with the response of spending to monetary actions strongly suggests that it would be more appropriate to place greater reliance on the latter form of stablization action.

3. Finding of a strong empirical relationship between economic activity and either of the measures of monetary actions points to the conclusion that monetary actions can and should play a more prominent role in economic stabilization than they have up to now.

4. Failure to recognize these relationships can lead to undesired changes in economic activity because of the relatively short lags add strong effects attributable to monetary actions.

5. Evidence was found which is consistent with the proposition that the influence of monetary actions on economic activity is more certain that that of fiscal actions.

6. Since monetary influence was also found to be stronger and to operate more quickly than fiscal influence, it would appear to be inappropriate, for stabilization purposes, for monetary authorities to wait very long for a desired fiscal action to be adopted and implemented.

7. Evidence found in this study suggests that the money stock is an important indicator of the total thrust of stabilization actions, both monetary and fiscal. This point is argued on two grounds. A. changes in the money stock reflect mainly what may be called discretionary actions of the Federal Reserve System as it uses its major instruments of monetary management--open market transactions, discount rate changes, and reserve requirement changes. b. the money stock reflects the joint actions of the Treasury and the Federal Reserve System in financing newly created Government debt. Such actions are based on decisions regarding the monetization of new debt by Federal Reserve actions, and Treasury decisions regarding changes in its balances at Reserve banks and commercial banks. According to this second point, changes in Government spending financed by monetary expansion are reflected in changes in the monetary base and in the money stock.[79]

This paper found that there is a definite advantage in using the single equation approach to determine whether fiscal or monetary policy has the greater effect on the economy. If the monetary and fiscal variables used are correctly specified, they will capture the direct and indirect impacts on economic activity; therefore, avoiding the problem of specifying and measuring various links between monetary and fiscal policies.

A weaker point in using a single equation approach is that it can only deal with a single question. It does not distinguish between the direct and indirect policy influences on the economy. For example, it doesn't show how output and employment are affected. Output in the short run is affected by a policy change, but in the long run, it is affected by natural resources, productivity, labor force, etc..

The obvious weak point in the Jordon-Anderson study then is that it doesn't take into consideration the long term effects of monetary and fiscal policy whereas the FRB-MIT simulations do. One of the monetarists answers to this problem would be that an automated monetary policy would sustain the growth rate in the long run anyway.

Another point to consider is that the Anderson-Jordon study didn't consider the multiplier-accelerator process. When the money income increases interests rates, and partial reserve initial rate movements, the monetary policy gradually dampens the long run effects. The multiplier-accelerator effects are expanded in earlier years.

When studying the effects of three expansionary policies with the FRB-MIT model, the results were arbitrary because there was nothing natural about comparing a $5 billion expenditure change with a $1 billion reserve change. The main interest were the paths which showed a more rapid real GNP peak for federal spending than for monetary policy. This particular simulation's findings was not in general agreement with the general findings. The monetarist findings contradict this particular simulation even without having to use an econometric model.

Although the general findings of the FRB-MIT simulations indicated that monetary variables are stronger than had been originally anticipated, the conclusion was that monetary policy worked more "slowly" than fiscal policy. An example to refute the finding would be that the response

of total spending to changes in government expenditures is small compared with the response of spending to monetary actions according to the monetarist findings.

The Anderson-Jordon study showed monetary actions to be more consistant than the FRB-MIT study showed fiscal actions to be.

These are only some of the early findings when comparing the two views of policy thought. Overall, the monetarists have a stronger case at this point because they can show a more direct relationship between changes in monetary policy and their effects on the GNP than can the fiscalists.

CHAPTER IV

EMPIRICAL RESEARCH

This paper will now report the author's own research findings on the following hypothesis:

1. The percentage change in NNP is a function of the percentage change of both money stock and price-deflator.
2. The percentage change in NNP is a function of both the high-employment surplus or deficit as a percent of NNP, and the price-deflator.
3. The percentage change in NNP is a function of the percentage change in the money stock, the high-employment budget surplus or deficit as a per cent of NNP, and the price-deflator.

These hypothesis were developed to test three commonly held propositions concerning the relative importance of monetary and fiscal actions in implementing economic stabilization policy. These propositions are: the response of economic activity to fiscal actions relative to that of monetary actions is (1) greater, (2) more predictable, and (3) faster.

The independent variable used to represent monetary policies was the money stock defined as currency in the hands of the public plus demand deposits. The principal reasons for using the money stock as a variable representing monetary policies were:

1. there is a significant body of monetary which incorporates the money stock as an important link between Federal Reserve

monetary actions and their ultimate impact on income, output, and prices.

2. among all variables that can be used as measures of monetary actions previously covered in the related studies, the monetary authorities have the most control over the money stock.

The independent variable used to represent the net effect of fiscal actions on economic activity was the high employment budget surplus or deficit. Taxing and spending actions of the federal government are generally believed to have a significant effect on spending, production, employment, and prices. The high-employment budget surplus or deficit is one of the best single measures of the net effect of taxing and spending because it "is a statistical summary of government spending and taxing activities."[80] The high-employment budget was originally developed in terms of a target for government fiscal operations but more recently the concept has served as a tool of economic analysis providing a measure of fiscal action and measuring the impact of the budget on the economy. Also, since the economy has grown over the years, and thus the impact of a $10 billion surplus has a greater effect on a $500 billion economy than on a $700 billion economy, the surplus or deficit as a per cent of NNP might be a more meaningful measurement.

The price-deflator was used as the third independent variable to account for inflationary changes in current NNP since current dollar figures were used in the monetary and fiscal policy variables. The price-deflator is computed as gross national product in current dollars divided by gross national product in 1958 prices and thereby measures the change in prices of all goods and services weighted by the amount spend on each of them.

NNP was used as the dependent variable because it leaves out depreciation and includes net investment and is therefore a good measure of change in economic activity.

Since all of the time series have strong trends, first differences tend to increase in size over time. Statistical considerations indicate that using percentage changes would be more appropraite.

As a step toward analyzing the three propositions presented earlier, empirical relationships are developed between the measures of fiscal and monetary policies. These relationships are developed by regressing quarter-to-quarter changes in NNP on quarter-to-quarter changes in the money stock, high-employment budget as a percentage of NNP, and the price deflator.

The values for the variables were obtained by using a step-wise multiple regression formula. Quarterly data was used for the period from the first quarter of 1950 to the third quarter of 1969.

At this point, for the reader's benefit, the terms and definitions used in this study are as follows:

(1) dependent variable - is a variable which is subject to change due to outside influence (independent variable) such as prices, employment, money stock, etc.

(2) independent variable - is a variable which affects changes in a dependent variable.

(3) r^2 - is a measure of the percent of the variance in changes in the dependent variable explained by the regression equation.

(4) beta coefficient - take into consideration the past variation of changes in each independent variable relative to the past variation of changes in dependent variable. The size of the beta coefficients can therefore be compared as measures of the relative contribution of each variable to variations in the dependent variable.

(5) T-Values - relates the size of the regression coefficient to the size of the coefficient, of the standard deviate. The greater t-value, the greater is the reliability of the estimated change in the dependent variable resulting from a change in the independent variables. The larger the t-value, the more confidence we have that the independent variables are related to economic activity.

(6) statistical significance - is measured by the T-values of the coefficients of the independent variables when measured against the same independent variable. The more statistically significant, the more reliable the relationship to economic activity.

In the first hypothesis, the quarterly percentage changes in NNP, which were used as indicators of economic activity, were regressed on the quarterly percentage changes of both the money stock, currency plus demand deposits, and the price deflator (tracing inflationary effects on NNP).

The first hypothesis was developed to determine the effects both the money stock and inflation have on economic activity. Since there are conflicting theories as to the time lag of the effects monetary policy has on economic activity, concurrent, one quarter lagged, and two quarter lagged observations were used.

The results are listed in Table XII.

The results of the first run (concurrent-money stock) indicated the price-deflator accounted for 12.7 per cent change in NNP. The price-price deflator and money stock together accounted for 18.6 percent change in NNP with the price accounting for more of the change than the money-stock. The price deflator was also more reliable in accounting for the changes in NNP than was the money stock.

TABLE XII

NNP REGRESSIONS ON MONEY STOCK AND PRICE - DEFLATOR

Concurrent	Multiple Correlation Coefficient (r)	r^2	Level of Significance	T-value	Level of Significance	Beta Coeff.
Variable 2	.357	.127	1%	3.3567	1 %	.3573
Variable 1	.431	.186	.1%	2.3375	2½%	.2440
Variable 2				3.1142	1%	.3251
1 qtr. lag						
Variable 2	.357	.127	1%	3.3567	1 %	.3573
Variable 1	.397	.158	.1%	1.6493	10%	.1803
Variable 2				2.8261	1 %	.3089
2 qtr. lag						
Variable 2	.357	.127	1%	3.3567	1 %	.3573
Variable 1	.415	.172	.1%	2.0213	2½%	.2155
Variable 2				2.29363	1 %	.3131

Note: Variable (1) money stock, quarterly percentage changes in;
(2) price-deflator, quarterly percentage changes in.

The results of the second run (one quarter lag--money stock) indicated the price-deflator and money stock together accounted for 15.8 % of the change in NNP and again the price-deflator being the more reliable in accounting for the change in NNP.

The results of the third run (two quarter lag-money stock) indicated the price-deflator and money stock together accounted for 17.2 % of the change in NNP and again the price - deflator being the more reliable in accounting for the changes in NNP.

It appears that the money stock has its greatest impact on economic activity immediately upon its policy implementation, a finding in disagreement with other theories postulating a longer lag period.

In the second hypothesis, the quarterly percentages in NNP were regressed on the quarterly percentages changes of the high-employment

budget surplus or deficit as a percent of NNP, and on the price-deflator.

The second hypothesis was developed to determine the effects both the fiscal theory and inflation have on economic activity. Since there are conflicting theories as to the time lag of the effects fiscal policy has on economic activity, concurrent, one quarter lugged, and two quarter lagged observations of the fiscal variable were used.

The results are listed in Table XIII.

TABLE XIII

NNP REGRESSION ON FISCAL VARIABLE AND PRICE-DEFLATOR

Concurrent	Multiple Correlation COEFFICIENT (R)	r^2	Level of Significance	t-Value	Level of Significance	Beta Coeff.
ariable 2	.357	.127	1 %	3.3567	1 %	.3573
ariable 1	.368	.135	1%	.8259		.0903
ariable 2				3.0930	1 %	.3378
qtr. lag						
able 2	.357	.127	1 %	3.3567	1 %	.3573
ariable 1	.373	.139	1 %	1.0063		.1074
ariable 2				3.2703	1 %	.3491
qtr. lag						
ariable 2	.357	.127	1 %	3.3567	1 %	.3573
ariable 1	.378	.143	1 %	1.1585		.1230
ariable 2				3.3649	1 %	.3574

TE: Variable (1) high-employment budgets' (surplus or deficit) as a percent of NNP
(2) quarterly percentage changes in the price-deflator

The results of the first run (concurrent - high-employment surplus or deficit as a percent of NNP) indicated the price deflator accounted for 12.7 per cent in NNP. The price deflator and fiscal variable together accounted for 13.5 per cent in NNP with the price deflator accounting for more of the change than the fiscal variable. The price-deflator was also more reliable in accounting for the changes in NNP than was the fiscal variable.

The results of the scond run (one quarter lag) indicated the price deflator and fiscal variable together accounted for 13.9 percent change in NNP with the price-deflator being more reliable.

The results of the third run (three quarter lag) indicated the price-deflator and fiscal variable together accounted for 14.3 per cent of the change in NNP with the price deflator being more reliable.

It appears that the fiscal policy variable has its greatest impact after two quarters which is consistent with monetary authorities lag theories.

A similar fiscal variable (except it didn't use the surplus or deficit figures but the actual budget figures) was used in the author's original second hypothesis but was discarded due to the fact that the fiscal variable didn't account for even one per cent of the change in NNP. See Table XIV.

TABLE XIV
NNP REGRESSION ON FISCAL VARIABLE AND PRICE-DEFLATOR

Concurrent	Multiple Correlation Coefficient (r)	r^2	Level of Significance	T-value	Level of Significance	Beta Coeff.
Variable 2	.357	.127	1 %	3.3567	1 %	.3573
Variable 1	.359	.129	1 %	-0.3492		-0.0393
Variable 2				3.2831	1 %	.3694
1 qtr. lag						
Variable 2	.367	.127	1 %	3.3567	1 %	.3573
Variable 1	.358	.128	1 %	-0.2302		-.025
Variable 2				3.3273	1 %	.3615
2 qtr. lag						
Variable 2	.357	.127	1 %	3.3567	1 %	.3573
Variable 1	.357	.127	1 %	- .0074		-.0008
Variable 2				3.2967	1 %	.3574

Note: Variables (1) High-employment budget as a percentage of NNP
(2) Price-deflator percentage change

In the third hypothesis, the quarterly percentage changes in NNP, were regressed on the quarterly high employment budget's surplus or deficit as a per cent of NNP, the quarterly percentage changes in the money stock, and on the quarterly percentage changes in the price deflator.

The third hypothesis was developed to determine the effects which monetary and fiscal policy plus the price - deflator have on NNP.

No lag was used with the money stock, and a two qarter lage was used with the high-employment budget's surplus or deficit as a per-cent of NNP because they were the best results obtained from the first and second hypothesis.

The results of the regression are listed in TABLE XV.

TABLE XV

NNP REGRESSION ON FISCAL AND MONETARY VARIABLES & PRICE DEFLATOR

Variable	Multiple Correlation Coefficient (r)	r^2	Level of Significance	t-value	Level of Significance	Beta Coefficient
3	.357	.127	1 %	3.3567	1 %	.3573
2	.431	.186	.1 %	2.3375	2½%	.2440
3				3.1142	1 %	.3251
1	.467	.218	.1 %	1.7456	5 %	.1824
2				2.6844	1 %	.2829
3				3.1058	1 %	.3201

Note: Variable (1) quarterly high-employment budgets surplus or deficit as a per cent of NNP
(2) quarterly percentage changes of the money stock
(3) quarterly percentage changes in the price-deflator

The results indicated that all the variables together only account for 21.8 per cent of the change in NNP. The price-deflator again was the most reliable.

Due to the strong price-deflator influence, it was dropped from the hypothesis.

The results from the revised hypothesis are listed in Table XVI.

The results from the revised hypothesis indicated that money stock accounted for 8.1 per cent of the change in NNP. The money stock and fiscal variable together account for only 11.8 per cent of the change in NNP with the money stock being the more reliable.

TABLE XVI

NNP REGRESSION ON MONETARY AND FISCAL VARIABLES

riable	Multiple correlation coefficient (r)	r^2	level of significance	t value	level of significance	Beta coeff.
2	.287	.081	2 %	2.6280	1 %	.2869
1	.343	.118	1 %	1.7369	5%	.1914
2				2.9674	1 %	.3271

Note: Variable (1) quarterly high-employment budget surplus or deficit as a per cent of NNp
(2) quarterly percentage changes in the money stock

Based on this paper's empirical research, we can come to two determinations: (1) either the variables chosen as measurements of fiscal and monetary policies do not contribute very much to the NNP change, or, (2) fiscal and monetary policy effects on economic stability are not as strong as had previously been thought.

Assuming the variables used were adequate measurements, then the results do indicate that monetary policy influence was stronger and more reliable and even faster (faster referring to when both variables were lagged by two quarters).

The major implication of the empirical research was that there isn't a sure method of measuring fiscal and monetary effects on economic stabilization.

CHAPTER V

CONCLUSION

The intent of this paper was to measure the impact of monetary and fiscal influences on economic activity over a 79 quarter period, I/1950-III/1969, and for selected longer periods.

Four years ago, the monetary policy was both expansionary and inflationary when the switch was made from long term federal debt to short term federal debt.

In studying both short term and long term effects, my study indicates a stronger evidence for monetary policy usage. Monetary policies had a larger, more reliable effect on economic stablization than did fiscal policies.

At this point in time, there is not much doubt why monetary policies should be given a more active role in economic stabilizations.

FOOTNOTES

1. "Staff Economic Study," Federal Reserve Bulletin, LIV (1968). p. 12.
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3. Ibid. p. 12.
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5. Ibid. p. 12.
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7. Ibid. p. 29.
8. Ibid. p. 29.
9. Ibid. p. 29.
10. "The Channels of Monetary Policy." Journal of Finance, XXIV (1969). p. 282.
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30. Leonall C. Anderson and Jerry L. Jordon, "Monetary and Fiscal Actions: A Test of Their Relative Importance In Economic Stabilization Reply," Federal Reserve Bank of St. Louis Review. (April, 1969), p. 16.

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50. Ibid. p. 14-15.

51. Ibid. p. 15.

52. Keith M. Carlson, "Estimates of the High-Employment Budget: 1947-1967," Federal Reserve Bank of St. Louis Review, (June, 1967), p. 6-13.

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